

MODEL F10 INSTALLATION MANUAL

RIELLO 40 SERIES

OIL BURNERS RETROFIT APPLICATIONS ONLY

NON-RETROFIT APPLICATIONS

If this burner is being installed in a packaged unit (ie. burner comes with a boiler or furnace), follow the installation and set-up instructions supplied with the heating unit, as settings may differ from those shown in this manual.

F10-2000-02 2902554-1

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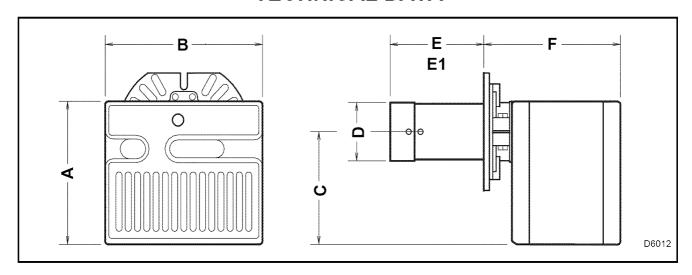
PARTS LIST

Your Riello 40 F10 burner should include the following parts. Please check to make sure all parts are present before beginning the installation.

QTY.	DESCRIPTION (parts bag)	QTY.	DESCRIPTION (carton)
2 -	Mounting flange bolts (short)	1 -	Burner chassis with cover
2 -	Semi-flange bolts (long)	1 -	Universal Mounting Flange
4 -	Nuts	2 -	Semi-flanges
2 -	Chrome nuts	1 -	Mounting gasket
1 -	Oil pump connector (supply)	1 -	Installation Manual
1 -	Oil pump connector (return)	1 -	By-pass plug
2 -	Female 1/4" NPT adapter	1 -	2.5 mm Allen key
1 -	Male 3/8" NPT adapter	* (se	eparate carton)
		1 -	Combustion head

^{*} OEM burners shipped with combustion head mounted.

RIELLO 40 F10 TECHNICAL DATA



DIMENSIONS

MODEL F10	A		C	D	E	
Inches	10 5/16	12	8 1/32	3 15/16	5	10 7/16
mm	262	305	204	100	127	265

E1: 10 inch long (254 mm) tubes also available.

SPECIFICATIONS

FUEL: No. 2 Fuel Oil

FIRING RATE: 1.45 to 2.95 GPH 4.7 to 9.5 kg/h

EFFECTIVE OUTPUT: 203,000 to 413,000 BTU/h 59.5 to 121 kW

51,160 to 104,130 kcal/h

VOLTAGE (Single Phase): 120V 60 Hz (+10% -15%)

ABSORBED ELECTRICAL POWER: 264 Watts

MOTOR (rated): 3250 rpm Run Current 2.2 AMP

CAPACITOR: 12.5 Microfarads 260V PUMP PRESSURE: 130 to 200 PSI

PRIMARY CONTROL: RIELLO 530 SE/C

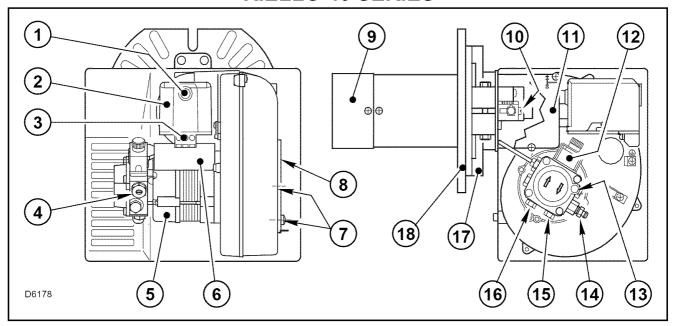
IGNITION TRANSFORMER: 8kV 16 mA

2 AMP 60° A5° 30° A To a second seco

MOUNTING FLANGE DIMENSIONS

MODEL F10	A	В	C	D
Inches	1 1/4	1/4	7/16	2 3/16
mm	32	6	11	56

OIL BURNER COMPONENTS IDENTIFICATION RIELLO 40 SERIES



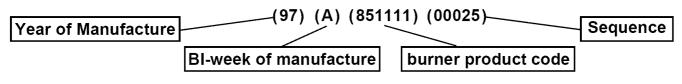
F10 BURNER COMPONENTS

- Lockout indicator lamp and Reset button
- 2. Primary control
- 3. Primary control sub-base
- Pump pressure regulator adjustment screw
- 5. Motor
- 6. Capacitor
- 7. Air adjustment fixing screws
- 8. Air shutter

- 9. End cone
- 10. Turbulator adjustment screw
- 11. Air tube cover
- 12. Coil
- 13. Vacuum gauge connection port
- 14. Pressure gauge and bleeder port
- 15. Return fuel line port
- 16. Supply fuel line port
- 17. Adjustable collar
- 18. Mounting flange with gasket

SERIAL NUMBER IDENTIFICATION

The Riello 15 character serial number, example, 97 A 8511111 00025, is identified as follows: 97 = last two digits of the year of manufacture; A = BI-week of manufacture; 8511111 = burner product code; 00025 = increment of 1 for each burner produced - specific to product code - reset to zero each January 1st.



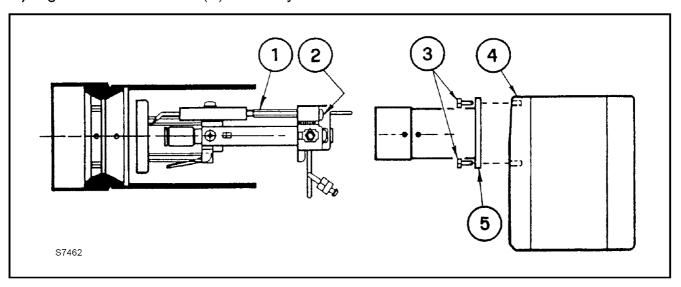
INITIAL SET-UP

- A) Remove burner and air tube from cartons. Check parts list (inside cover) to ensure all parts are present.
- **B)** Remove burner cover by loosening the three screws securing it. Remove control box and air tube cover (see page 7).
- C) Remove drawer assembly from air tube, insert nozzle and set turbulator adjustment for specific input required (see pages 7 & 8), then set aside.
- **D)** Mount air tube to burner chassis (see page 3).

ASSEMBLY OF AIR TUBE TO BURNER CHASSIS

The air tube and drawer assembly are shipped in a carton separate from the burner chassis. Choose the proper air tube length to obtain the tube insertion for the specific installation.

- A) Remove the AIR TUBE and BURNER CHASSIS from their respective cartons.
- **B)** Remove the DRAWER ASSEMBLY (1) from inside the AIR TUBE by loosening the screw (2). Carefully pull the DRAWER ASSEMBLY out of the AIR TUBE, instal the required nozzle (see page 7) and set aside.
- **C)** Remove the two BOLTS (3) from FRONT PLATE (4) of the BURNER CHASSIS. Align the two holes on the AIR TUBE HOLDING PLATE (5) with the two holes left open on the BURNER CHASSIS FRONT PLATE when the BOLTS (3) were removed. Replace the BOLTS and finger tighten only. Re-install DRAWER ASSEMBLY into AIR TUBE. Tighten SCREW (2) securely (see page 7).
- D) Tighten the two bolts (3) securely.



MOUNTING THE BURNER TO THE BOILER OR FURNACE

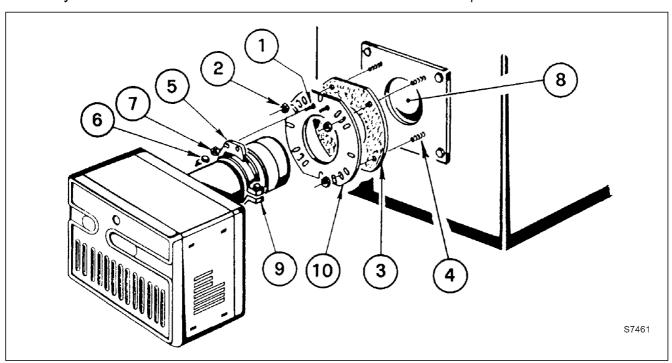
There are three possible methods to mount the burner, depending on the individual application. These are:

- 1) Universal flange bolted to Boiler/Furnace unit.
- 2) Semi-flange collar bolted to Boiler/Furnace unit.
- 3) Universal flange mounted to optional Pedestal mount, where flange-mounting direct to appliance is not possible. Pedestal kit must be ordered separately.

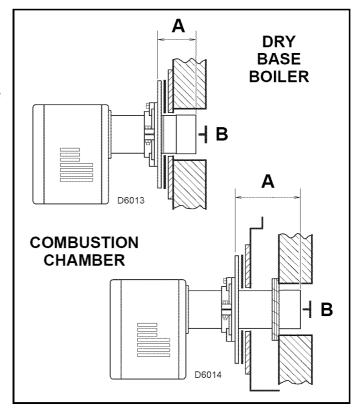
METHOD 1 - UNIVERSAL MOUNTING FLANGE

A) Insert the two BOLTS (1) into the UNIVERSAL MOUNTING FLANGE (10) from the flat side, ensuring the bolt heads are flush with the flat surface. Secure in place using two special CHROME NUTS (2) provided.

B) Position the MOUNTING GASKET (3) between the flat surface of the UNIVERSAL MOUNTING FLANGE (10) and the appliance. Line up the holes in the UNIVERSAL MOUNTING FLANGE with the STUDS (4) on the appliance mounting plate and securely bolt the UNIVERSAL MOUNTING FLANGE to the plate.



- C) Secure the two semi-flanges of the ADJUSTABLE COLLAR (9) to the AIR TUBE using the two long BOLTS (6). Be sure that the ADJUSTABLE collar is properly positioned so the outside edge of the END CONE will be at least 1/4 inch (6.5 mm) back from the inside wall of the refractory of the combustion chamber (see dimension B at right). The measured length (A), is to include MOUNTING GASKET and FLANGE, if used.
- **D)** The burner may now be attached to the heating unit by inserting the AIR TUBE through the BURNER ACCESS HOLE (8) and into the appliance, making sure the BOLTS (1) line up with the two HOLES (5) in the ADJUSTABLE COLLAR. Secure the burner in place using two NUTS (7).



A visual verification of the air tube insertion into the combustion chamber of the heating unit is suggested. Dimension B should be at least 1/4" (see drawing).

NOTE: A suggested method for creating mounting bolt holes in the mounting gasket: Hold the gasket against the appliance mounting bolts using the mounting flange for proper positioning. Lightly tap the flange with a hammer to form the holes.

METHOD 2 - SEMI-FLANGE COLLAR

- A) Follow item C from METHOD 1.
- B) Align the air tube and attached adjustable collar so air tube is centered in the burner access hole of the boiler/furnace unit. Mark the center of the two holes in the ADJUSTABLE COLLAR on to the front plate of the heating unit. Then drill 1/4 inch (6.5 mm) holes through the front plate of the unit, using marks as a guide.
- C) Install two short BOLTS (1) through the front plate of the heating unit from the inside, and secure on the outside using the two special CHROME NUTS (2).
- D) Follow item D from METHOD 1.

METHOD 3 - PEDESTAL MOUNT

Secure the MOUNTING FLANGE to MOUNTING PEDESTAL using the hardware provided with the pedestal. Secure burner to MOUNTING FLANGE as in METHOD 1, items A, C and D.

NOTE: It is suggested that the pedestal be anchored in position on the floor by installing brackets over the pedestal tube and securing brackets to the floor.

WARNING: WHEN THE COMBUSTION CHAMBER IS LINED WITH A REFRACTORY MATERIAL, IT IS IMPERATIVE THAT THE END CONE NOT PROTRUDE INTO THE CHAMBER AREA, AS EXCESSIVE HEAT AT BURNER SHUT-DOWN WILL DAMAGE THE END CONE.

ELECTRICAL CONNECTIONS

It is advisable to leave the control box off the sub-base while completing the electrical connections to the burner.

1) Wire access hole (Use BX electrical connector)

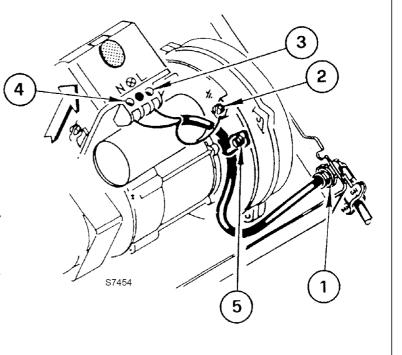
2) Earth ground conductor terminal (GREEN WIRE)

- Hot conductor terminal (BLACK WIRE)
- 4) Neutral conductor terminal (WHITE WIRE)
- 5) Strain relief clamp

WARNING: The hot (black) wire must be connected to the L terminal and the neutral (white) wire must be connected to the N terminal or the primary safety control will be damaged.

Do not connect either wire to the

⊗Terminal.



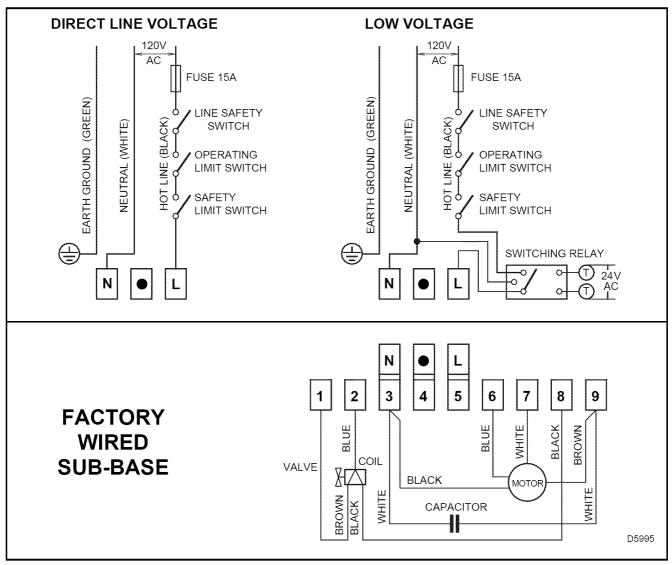
The burner may be controlled using either a DIRECT LINE VOLTAGE control circuit (120V AC 60 cycle) **OR** a LOW VOLTAGE control (24V AC 60 cycle) using a R8038A Honeywell switching relay or equivalent.

Using the appropriate diagram below, make electrical connections to burner. All wiring must be done in accordance with existing electrical codes, both national and local.

When all electrical connections have been made, the control box may be put back in place on the sub-base.

WARNING: DO NOT activate burner until proper oil line connections have been made, or failure of the pump shaft seal may occur.

APPLICATION FIELD WIRING

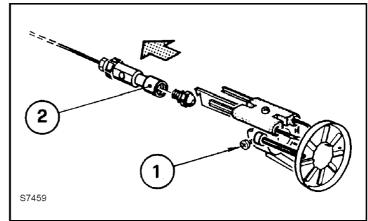


REMOTE SENSING OF SAFETY LOCKOUT: The SAFETY SWITCH in the 530SE CONTROL BOX is equipped with a contact allowing remote sensing of burner lockout. The electrical connection is made at terminal 4 (●) on the SUB-BASE. Should lockout occur the 530SE CONTROL BOX will supply a power source of 120Vac to the connection terminal. The maximum allowable current draw on this terminal (4) is 1 Amp.

WARNING: If a neutral or ground lead is attached to this terminal, the CONTROL BOX on the burner will be damaged should lockout occur.

NOZZLE PLACEMENT

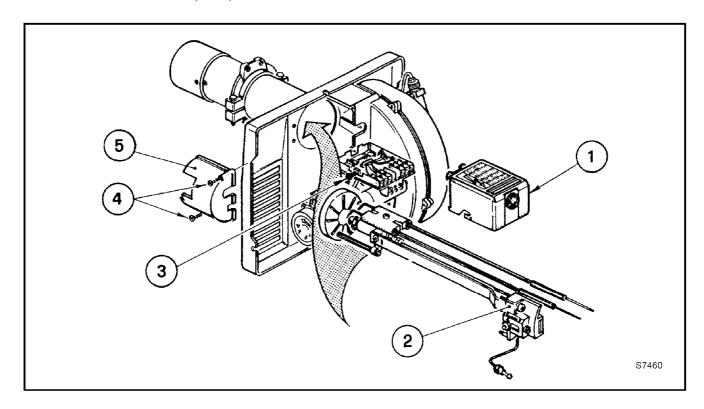
- A) Determine the proper firing rate for the boiler or furnace unit, considering the specific application, then use the Burner Set-up chart on page 12 to select the proper nozzle and pump pressure to obtain the required input from the burner.
- **B)** Remove the NOZZLE ADAPTER (2) from the DRAWER ASSEMBLY by loosening the SCREW (1).



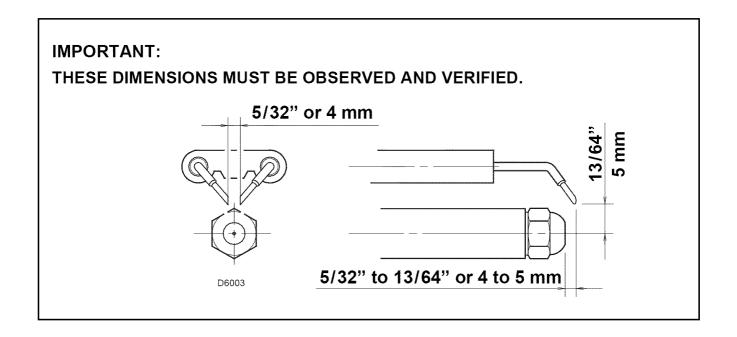
- **C)** Insert the proper NOZZLE into the NOZZLE ADAPTER and tighten securely (Do not overtighten).
- **D)** Replace adapter, with nozzle installed, into drawer assembly and secure with screw (1).

INSERTION/REMOVAL OF DRAWER ASSEMBLY

- **A)** To remove drawer assembly, loosen SCREW (3), then unplug CONTROL BOX (1) by carefully pulling it back and then up.
- **B)** Remove the AIR TUBE COVER PLATE (5) by loosening the two retaining SCREWS (4).
- C) Loosen SCREW (2), then slide the complete drawer assembly out of the combustion head as shown
- **D)** To insert drawer assembly, reverse the procedure in items A to C above, then attach fuel line to the pump.



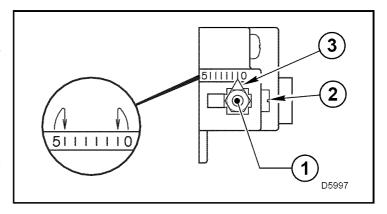
ELECTRODE SETTING



TURBULATOR SETTING

- A) Loosen NUT (1), then turn SCREW (2) until the INDEX MARKER (3) is aligned with the correct index number as per the Burner Set-up chart, on page 12.
- **B)** Retighten the RETAINING NUT (1).

NOTE: Zero and five are scale indicators only. From left to right, the first line is 5 and the last line 0.



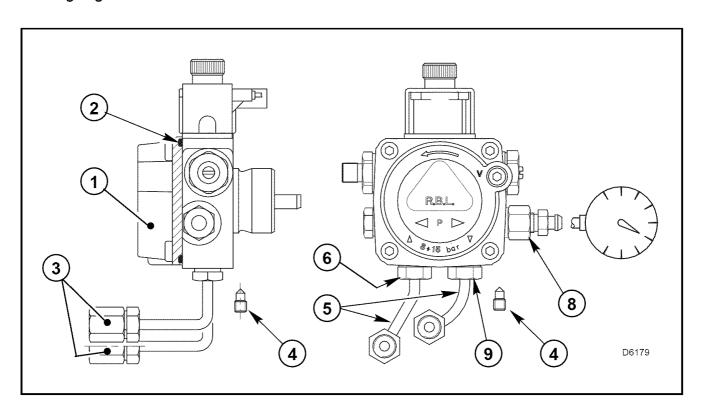
OIL LINE CONNECTIONS

This burner is shipped with the oil pump set to operate on a **single** line system. To operate on a **two** line system the by-pass plug **must** be installed.

Warning: Do not operate a **single** line system with the by-pass plug installed. Operating a **single** line system with the by-pass plug installed will result in damage to the pump shaft seal.

Note: Pump pressure must be set at time of burner start-up. A pressure gauge is attached to the **PRESSURE PORT** (8) for pressure readings. Two **PIPE CONNECTORS** (5) are supplied with the burner for connection to either a single or a two-pipe system. Also supplied are two **ADAPTORS** (3), two female 1/4" NPT, to adapt oil lines to burner pipe connectors. All pump port threads are **British Parallel Thread** design. Direct connection of NPT threads to the pump **will damage** the pump body.

Riello manometers and vacuum gauges do **not** require any adaptors, and can be safely connected to the pump ports. An NPT (metric) adapter **must** be used when connecting other gauge models.



SINGLE LINE (GRAVITY FEED SYSTEM)

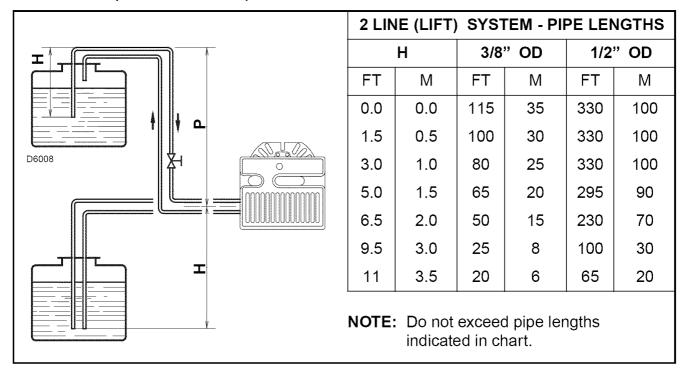
A) The burner is shipped configured for use in single line applications. No changes to the oil pump are required for use in single line applications.

NOTE: If the **pump cover (1)** is removed for any reason, be sure the O-ring (2), is properly seated in the pump cover (1) before re-attaching the pump cover to the pump housing.

SING	SLE LINE	SYST	EM - PII	PE LEN	IGTHS	
	Н	3/8'	' OD	1/2	" OD	
FT	M	FT	M	FT	М	
1.5	0.5	33	10	65	20	
3.0	1.0	65	20	130	40	D6009
5.0	1.5	130	40	260	80	
6.5	2.0	195	60	325	100	
NOT	E: Do no indica	ot exce ated in		engths		

B) Connect the pipe connector to the SUPPLY PORT (6) of the pump. Attach the required piping to this pipe connector. Be sure that the plug in the RETURN PORT (9) is tightened securely.

TWO LINE (LIFT SYSTEM)



A) If a two line system is required, install the By-pass plug (4) provided. The by-pass plug is installed in the return port (9) of the pump. A 2.5 mm hexagonal key provided with the by pass plug is to be used to install the plug. DO NOT use an inch size hexagonal key, damage to the by-pass plug may result. When operating on a two line system, supply and return lines should be the same diameter and both should extend to the same depth inside the fuel tank. Be sure there are no air leaks or blockages in the piping system.

Any obstructions in the return line will cause failure of the pump shaft seal. Do not exceed the pipe lengths indicated in the tables.

To install the by-pass plug:

- 1) Remove the return plug (9).
- 2) Install the by-pass plug (4) using the 2.5 mm hexagonal key.
- **B)** Attach the two PIPE CONNECTORS (5) to the pump SUPPLY and pump RETURN PORTS (6 and 9). Attach the required piping to these two pipe connectors using the NPT/METRIC ADAPTERS that are supplied with the burner.

WARNING: Pipe dope or Teflon tape are NOT to be used on any direct oil connection to the fuel pump.

WARNING: The height "P" in Pipe Length charts on page 9 and 10 should not exceed 13 feet (4 m).

WARNING: The vacuum should not exceed 11.44 inches of mercury.

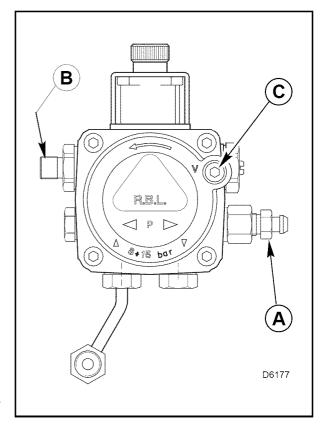
IMPORTANT: An external, appropriately listed and certified oil filter must be placed in the fuel line between the fuel tank and the burner pump.

PUMP PURGE

NOTE: to protect the pump gears, it is advisable to lubricate the pump prior to purging a lift system. Apply oil through the VACUUM PORT (C).

A) SINGLE LINE (GRAVITY FEED SYSTEM)

- **A)** Loosen the bleeder valve (A) until oil flows out. Tighten the bleeder valve securely and start burner.
- B) When bleeding the pump by pressure.
- 1) Loosen the bleeder valve (A).
- 2) Disconnect nozzle oil supply line at the pump nozzle port (B).
- 3) Attach a flexible plastic tube to the pump nozzle port, directing the oil flow into a bucket.
- 4) Loosen the screws securing the air tube cover, allowing it to be removed freely.
- 5) Holding the air tube cover in its proper location start the burner.
- 6) When the solenoid valve is engaged, approximately 10 seconds after starting, remove the air tube cover and shine a light source on the photo-cell, allowing it to see false light.
- 7) Run the burner until the fuel pump has been purged of air, then tighten the bleeder valve and immediately shut down the burner.
- 8) Reinstall the air tube cover and nozzle line.
- 9) The burner can now be started normally.



WARNING: Omitting steps 2 and 3 will result in a collection of unburned oil in the combustion chamber creating a hazardous situation upon burner startup.

B) TWO LINE (LIFT SYSTEM)

Turn off the main power source to the burner and remove the air tube cover. Shine a light source on the photo-cell (now visible where the air tube cover was removed), return power to the burner and activate the burner. With the light source in place, the burner will operate in prepurge only. Once the burner is purged, turn off the power source and replace the air tube cover. Return power to the burner. The burner is now ready to operate.

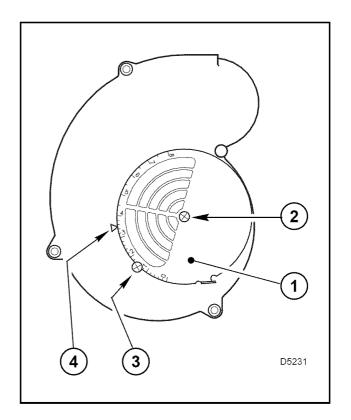
ATTENTION: It is important that the fuel line be completely sealed and free from air leaks or any internal blockages.

IMPORTANT! WHEN THE BY-PASS PLUG IS INSTALLED, A TWO PIPE SYSTEM MUST BE USED OR FAILURE OF THE PUMP SHAFT SEAL WILL OCCUR.

SETTING THE AIR ADJUSTMENT PLATE

- A) Regulation of the combustion air flow is made by adjustment of the manual AIR ADJUSTMENT PLATE (1) after loosening the FIXING SCREWS (2 & 3). The initial setting of the air adjustment plate should be made according to Column 5 in the Burner Set-up Chart.
- **B)** The proper number on the manual AIR ADJUSTMENT PLATE (1) should line up with the SETTING INDICATOR (4) on the fan housing cover. Once set, the air adjustment plate should be secured in place by tightening SCREWS 2 and 3.
- C) The final position of the air adjustment plate will vary on each installation. Use instruments to establish the proper settings for maximum CO₂ and a smoke reading of zero.

NOTE: Variations in flue gas, smoke, CO₂ and temperature readings may be experienced when the burner cover is put in place. Therefore, the burner cover **must** be in place when making the final combustion instrument readings, to ensure proper test results.



BURNER SET-UP CHART

		2	3		4	5	
ACTUAL FIRING RATE ± 5%		NOZZLE SIZE	PUMP PRESSURE		TURBULATOR SETTING	AIR DAMPER SETTING	
GPH	kg/h	GPH	PSI	BAR	SETTING	SETTING	
1.45	4.7	1.25 x 60°	145	10	1.5	2.7	
1.80	5.8	1.50 x 60°	145	10	2.0	2.8	
2.10	6.8	1.75 x 60°	145	10	2.5	3.1	
2.40	7.8	2.00 x 60°	145	10	3.5	3.4	
2.75	8.9	2.25 x 60°	150	10.4	4.0	4.2	
2.95	9.5	2.50 x 60°	140	9.8	4.5	4.2	

NOZZLES: Monarch R-PLP, Delavan W-B, Danfoss S-B, Steinen SS-S, Hago P.

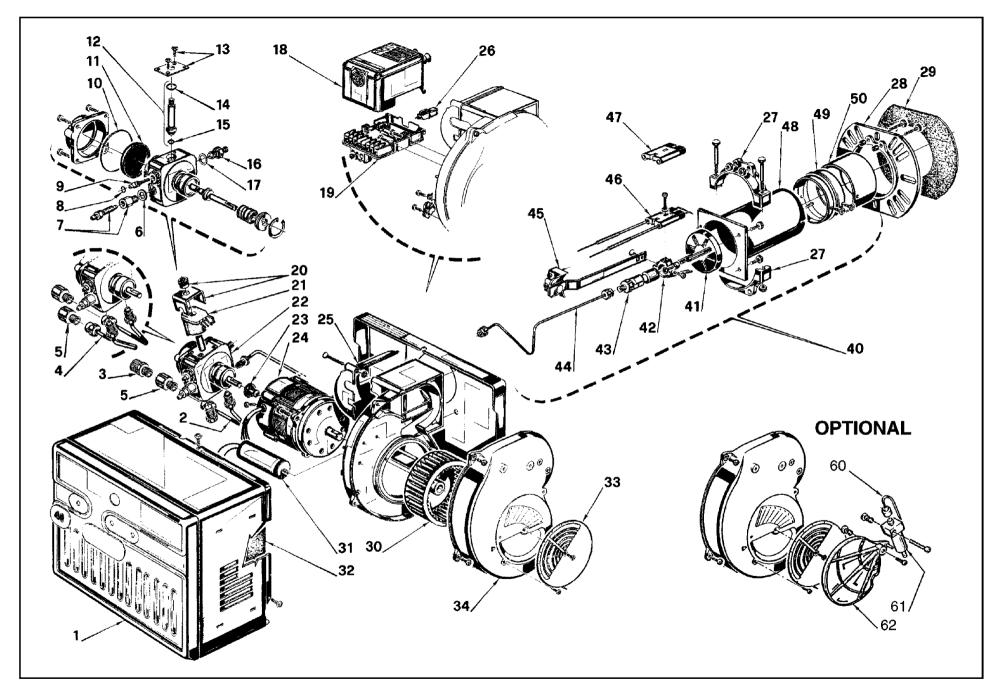
NOTE: A 60° degree nozzle is suggested, however, a 80° degree nozzle may be used in cases where the flame is unstable at light-off when operated at low ambient temperatures.

COMBUSTION CHAMBER

Follow the instructions furnished by the boiler/furnace manufacturer. Size retrofit application according to the appropriate installation codes (eg. CSA B139 or NFPA #31).

NON-RETROFIT APPLICATIONS

If this burner is being installed in a packaged unit (ie. burner comes with a boiler or furnace), follow the installation and set-up instructions supplied with the heating unit, as settings will differ from those shown in this manual.



SPARE PARTS LIST

NO.	CODE	DESCRIPTION
1	3007234	Burner Back Cover
2	3006992	Pipe connector - Supply
3	3006571	3/8" NPT/Metric Adapter - Male
4	3006993	Pipe connector - Return
5	3005847	1/4" NPT/ Metric Adapter - Female
6	3007077	Crushable Metal Washer
7	3007568	Bleeder
8	3007028	O-Ring - Pump Pressure Regulator
9	3007202	Regulator Screw
10	3007162	O-Ring - Pump Cover
11	3005719	Pump Screen
12	3006925	Valve Stem
13	3007203	Valve Stem Plate
14	3007029	O-Ring - Valve Stem Upper
15	3007156	O-Ring - Valve Stem Lower
16	3007268	Nozzle Outlet Fitting
17	3007087	Crushable Metal Washer
18	3001157	Primary Control 530SE/C
19	3002278	Primary Control Sub Base
20	3006553	Coil U-Bracket and Knurled nut
21	3002279	Coil
22	3007802	Pump
23	3000443	Pump Drive Key
24	3005843	Motor
25	3007317	Air Tube Cover
26	3002280	Photo-cell
27	3005854	Semi Flange
28	3005855	Universal Mounting Flange
29	3005856	Mounting Gasket
30	3005788	Fan
31	3005844	Capacitor 12.5 μF
32	3007357	Acoustic Liner

NO.	CODE	DESCRIPTION
33	3007205	Manual Air Shutter
34	3007209	Air Intake Housing
40	3949071	Short Combustion Head 5" (273T1)
41	3006978	Turbulator Disc
42	3006966	Electrode Support
43	3006965	Nozzle Adapter
44	3006979	Nozzle Oil Tube - Short
45	3005888	Regulator assembly - Short
46	3005890	Electrode assembly - Short
47	3005869	Electrode Porcelain
48	3006981	Short Air Tube
49	3006983	End Cone Adapter
50	3006984	End Cone
40	3949072	Long Combustion Head 10" (273T2)
41	3006978	Turbulator Disc
42	3006966	Electrode Support
43	3006965	Nozzle Adapter
44	3006980	Nozzle Oil Tube - Long
45	3005889	Regulator assembly - Long
46	3005891	Electrode assembly - Long
47	3005869	Electrode Porcelain
48	3006982	Long Air Tube
49	3006983	End Cone Adapter
50	3006984	End Cone
OPTIO		
60	3008055	Capillary Tube
61	3006911	Hydraulic Jack
62	3000879	Hydraulic Air Shutter
·		

FOR CANADA PRECAUTIONS

AIR FOR COMBUSTION

Do not install burner in room with insufficient air for combustion. Be sure there is an adequate air supply for combustion if the boiler/furnace room is enclosed. It may be necessary to create a window to permit sufficient air to enter the boiler/furnace room. The installer must follow local ordinances in this regard. Should local ordinances be lacking, it is suggested that the installer follow CSA standard B139.

CHIMNEY

Be sure chimney is sufficient to handle the exhaust gases. It is recommended that only the burner be connected to the chimney. Be sure that it is clean and clear of obstructions.

OIL FILTER

An external oil filter is REQUIRED, even though there is an internal strainer in the pump. The filter should be replaced at least once a year, and the filter container should be thoroughly cleaned prior to installing a new filter cartridge.

DRAFT

Follow the instructions furnished with the heating appliance.

The pressure in the combustion area should be kept as close to zero as possible.

The burner will operate with a slight draft or pressure in the chamber.

ELECTRICAL CONNECTIONS

All electrical connections should be done in accordance with the C.E.C. Part I, and a local codes. The system should be grounded.

CONTROL BURNER OPERATION

Check out the burner and explain its operation to the homeowner. Be sure to leave the Owner's Instruction sheet with the homeowner.

FIRE EXTINGUISHER

If required by local codes, install an approved fire extinguisher.

FOR USA PRECAUTIONS

AIR FOR COMBUSTION

Do not install burner in room with insufficient air for combustion. Be sure there is an adequate air supply for combustion if the boiler/furnace room is enclosed. An opening of at least twice the area of the flue should be available, or one square foot of area for every gallon of firing rate. It is important to have one opening near the floor, and one near the ceiling. It may be necessary to create a window to permit a sufficient air to enter the boiler/furnace room. The installer must follow local ordinances in this regard. Should local ordinances be lacking, it is suggested that the installer follow NFPA manual # 31.

CHIMNEY

Be sure chimney is sufficient to handle the exhaust gases. It is recommended that only the burner be connected to the chimney. Be sure that it is clean and clear of obstructions.

OIL FILTER

An external oil filter is REQUIRED, even though there is an internal strainer in the pump. The filter should be replaced at least once a year, and the filter container should be throughly cleaned prior to installing a new filter cartridge.

DRAFT

Follow the instructions furnished with the heating appliance.

The pressure in the combustion area should be kept as close to zero as possible. The burner will operate with a slight draft or pressure in the chamber.

ELECTRICAL CONNECTIONS

All electrical connections should be done in accordance with the National Electrical Code, and all local ordinances. In most localities, a number 14 wire should be used inside a metal conduit. The system should be grounded. A service switch should be placed close to the burner on a fireproof wall in an easily accessible location.

CONTROL BURNER OPERATION

Check out the burner and explain its operation to the homeowner. Be sure to leave the Owner's Instruction sheet with the homeowner.

FIRE EXTINGUISHER

If required by local codes, install an approved fire extinguisher.

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